SMART CARD APPARATUS AND METHOD OF PROGRAMMING SAME

This is a continuation of application Ser. No. 838,095, filed Mar. 10, 1986 now abandoned.

BACKGROUND OF THE INVENTION

The present invention relates to a smart card apparatus and a method for programming the same. More particularly, the present invention relates to a smart card apparatus and method for programming same with an open architecture approach.

Substantially flat, thin plastic articles such as credit cards, bank cards, driver licenses, membership cards, etc., are currently in widespread use. Recently, manufacturers of these cards have provided such cards with their own microcomputer. Such cards are commonly being referred to as smart cards. The potential uses for such smart cards are tremendous. For example, a smart card might contain a person's entire medical history, financial information, etc. In addition, such cards might be used to automatically debit one's bank account when purchasing items such as groceries, clothes, etc. In view of the large potential use of the smart card, a smart card and method for programming the same is required which will allow rapid mass production and personalization of such smart cards. Moreover, there is a need for a smart card wherein the data may be readily stored, altered, retrieved, and protected. In addition, there is a need for a smart card which can be readily adapted to different applications as they arise. Also, there is a need for a smart card which is very secure and resistant to tampering. The present invention solves this problem and many other problems associated with smart cards.

SUMMARY OF THE INVENTION

The present invention relates to a smart card apparatus including a microcomputer. The microcomputer is programmed to include a smart card control program. In addition, the microcomputer is programmed to include a data dictionary and personalized, user data.

The present invention also relates to a method of making a smart card as described above. The method includes the steps of programming the microcomputer with the smart card control program. Programming a data dictionary for defining the data, security and feature requirements of the smart card control program. Programming the microcomputer with application specific data and personalized user data.

The present invention provides a smart card that can be treated similar to a disk device wherein data may be stored, altered, retrieved and protected. The application developer (card issuer) defines the data environment as part of the application development and this definition resides in the smart card as a data dictionary along with the associated data elements. The present invention provides a smart card whose data can be accessed and used much in the same way that a disk based filing system is used.

Additionally, the present invention provides a generic smart card and associated utilities and development tools to the application community to assist in development of smart card application. The tools will be in the form of standard message formats and protocols to address the smart card. The message formats and protocols will preferably be ISO compatible.

The present invention provides a generic smart card apparatus which will be cheaper overall since there is one standard product.

Additionally, the present invention avoids the need for special masks which will result in better response time from suppliers of the microcomputer.

Yet another advantage of the present invention is that the time and cost of programming an application is reduced and therefore will facilitate use of smart card apparatus.

In a preferred embodiment of the present invention, the use of electrically erasable programmable read only memory (EEPROM) will enhance the logical lifespan of smart card apparatus by reusing memory resources.

Yet another advantage of the EEPROM embodiment of the present invention is that the EEPROM will allow modification of smart card apparatus in a much cheaper and faster manner than with EPROM based products, although EPROM might be used in certain applications.

Yet another advantage is that there is less risk in application development by the card issuer because the technical functions are already included. Moreover, this translates into reduced development time and cost.

Still another advantage of the present invention is its transparency to the actual microcomputer features. The microcomputer can be changed and such change will be transparent to the user. As prices and features change this is important since microcomputer products are quickly outdated.

A particularly advantageous feature of the present invention is that it enables the rapid, mass production of smart card apparatus. The microcomputers can be programmed with the smart card program prior to being associated with the smart card apparatus. Subsequently, the smart card apparatus can then be programmed for the particular application and programmed with personalized user data.

Another particular advantage of the present invention is the open ended architecture approach of the present invention which makes the smart card apparatus of the present invention very flexible and adaptable to different applications. The present invention utilizes predefined interfacing rules and a data dictionary which facilitates the open ended nature of the present invention.

Additionally, the present invention provides a smart card with increased security. Varying levels of security can be readily built into the smart card; for example, certain fields of data might be required to match; i.e., PIN number, or the smart card will be deactivated.

These and various other advantages and features of novelty which characterize the invention are pointed out with particularity in the claims annexed hereto and forming a part hereof. However, for a better understanding of the invention, its advantages, and objects obtained by its use, reference should be made to the drawings which form a further part hereof and to the accompanying descriptive matter, in which there is illustrated and described a preferred embodiment of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings, in which like reference numerals and letters indicate corresponding parts throughout the several views,

FIG. 1 is a diagrammatic top plan view of a smart card apparatus in accordance with the principles of the present invention;